Also, note that a roadway's formal classification as urban or rural may differ from actual site circumstances or prevailing conditions. An example includes a rural arterial route passing through a small town. The route may not necessarily be classified as urban, but there may be a significant length over which the surrounding land use, prevailing speeds, and transportation functions are more urban or suburban than rural. Designers need to recognize such situations and apply common sense judgments in interpreting design criteria and developing appropriate solutions or design approaches.

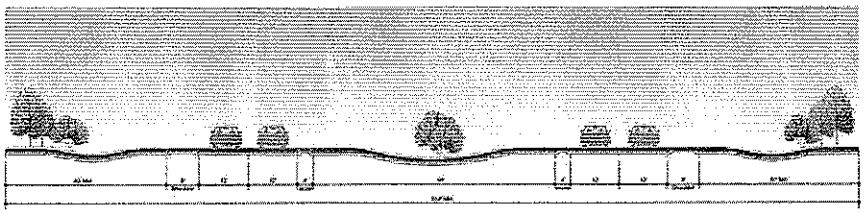
This guide does not seek to redefine functional classifications, as the Green Book is the nationally recognized primary reference. It does, however, offer a broader range of roadway classes and settings that are more pertinent to transportation landscape and environmental design.

For Creating Complete Corridors, four roadway types are used, expanding on the Green Book's three functional classifications of arterial, collector and local. The road classes here are: freeways, expressways, arterials, and collectors. Local roads are omitted here, as they are too broadly diverse to be adequately addressed by a national guide, and are better designed with input from local guides and standards as well as the Green Book.

2.1 Road Class

Freeway

Freeways provide the highest level of service of any roadway. They are fully grade-separated, generally built to or close to interstate standards, with access limited to entrance and exit ramps. Freeways almost always have a minimum of two lanes in each direction. In locations with high traffic volumes, they often have three or four lanes, occasionally more, in each direction. Cross connections between lanes in opposite directions, if provided at all, are limited to emergency and service vehicles. No direct access is provided to adjacent property. Some states provide continuous frontage roads along freeways, providing access to adjacent property and diversion routes, but presenting challenges for land use and aesthetic controls.



Expressway

The closest Green Book functional classification to expressways is principal arterials. The expressway road class refers to either median-divided roadways similar to freeways, but with occasional at-grade access to crossing roads and adjacent properties, or to undivided roadways with limited access to adjacent properties and access control of connections to crossing streets.

The Green Book functional classification corresponding to median-divided roadways is four-lane divided rural arterial.

Undivided expressways most closely correspond to the Green Book's rural arterial. An example would be the Blue Ridge Parkway in North Carolina and Virginia, a

I disagree with this. an express way is a short Road designed to Interstate standards to transport people large numbers of people on off the interstate. It is not a separate class.

Remote

Remote settings are comprised of extensive natural areas with few, if any, built features. Examples include large State or national parks or forests, extensive prairies or forests, mountain ranges or other lands where there is little or very occasional development.

3 if you eliminate Express Way. ~~18~~

The combination of ~~four~~ road classes and six settings results in 24 roadway corridor types to guide planning and design decisions.

Exurban Setting
Photo: Paris Lexington Road, Kentucky, xxx

2.3 Roadway Corridor Types

Urban Core Corridors

Set in densely developed centers of cities and towns, urban core roads usually exhibit very limited rights-of-way. Moving traffic is often highly constrained by pedestrians, transit services, and on-street parking. Higher-speed through traffic may be grade-separated or diverted around the core. Due to the many constraints on this group of roads, urban core transportation often requires innovative solutions not addressed by guides or standards.

- Urban Core Freeways can be barriers between the core and adjacent districts or neighborhoods, or may disrupt the urban core itself. Because of right-of-way constraints, these roads often cannot meet all Green Book freeway standards, thus requiring innovative design and careful coordination with local land uses.
- Urban Core Expressways are uncommon but useful when arterial streets require traffic capacity upgrading and when right-of-way or contextual constraints limit the ability to completely meet freeway design standards.
- Urban Core Arterials, due to their need to serve dense downtown land uses, may closely resemble urban core collectors. They typically carry higher volumes of traffic, with a greater mix of local-destination traffic and through or long-distance traffic, including commuters or visitors, and might function as one-way streets.
- Urban Core Collectors are most often local downtown streets.

So if we build an ~~inter~~ interstate not to standards we call it an expressway?

Rural Setting: Meeting of the Great Rivers National Scenic Byway: Alton, Illinois
Photo: www.dot.state.il.us/byways.html

Remote Setting: Zuni Canyon Road; Grants, New Mexico
Photo: xxxx

Urban Corridors

Urban roads are set in densely developed cities. These streets are limited by right-of-way availability, existing buildings, infrastructure, and civic spaces, generally resulting in higher traffic volumes and slower speeds. Urban corridors generally emphasize hardscape, or constructed elements, with plantings fitting into available space. Proximity and variety of land uses make access management a critical aspect of planning and design. Transit, pedestrian, and bicycle uses must nearly always be accommodated.

- Urban Freeways, serving local, intercity, and interstate traffic, carry some of the heavy traffic volumes in metropolitan areas, but can be barriers between urban districts because of their size.
- Urban Expressways are most often upgraded arterials that cannot meet freeway standards because of right-of-way constraints, connectivity requirements, or community opposition to a more intrusive freeway.

Contrary to expectations, fewer collisions may occur on substandard roads Photo: http://www.co.washington.or.us/sheriff/media/photos/h2_wreck.jpg

before construction. Standard methods for measuring safety, mobility, and access are typically considered.

The public expects that all roadway improvement projects result in a least one type of functional improvement, and typically two: safety and mobility. (Frequently a reduction in access that leads to an improvement in safety or mobility is also generally acceptable except to those specifically inconvenienced.) Although these measurements would seem rather straight forward, in fact they are frequently misunderstood and misapplied, especially measurements for safety.

Safety

It is important that what is measured is not the improvement itself but rather the change in a road's "behavior." For example, a road may be considered "unsafe" because it is not up to a particular standard—its lanes may be too narrow, there may be curves that are too tight for road's functional type, shoulders may be unpaved—it is deemed "deficient" and the agency declares that it should be improved.

Yet, the accidents that should be occurring, are not. In fact, the road not only has less accidents but the accidents that do occur are less severe than a parallel road a few miles away that was recently brought up to standards. Both roads have the same type and volumes of traffic, serve the same community, have similar access and mobility characteristics but the substandard road performs better in terms of safety. Why?

Why? Because people are not billiard balls. They think. They react. They understand hazards and respond accordingly. Driving isn't about applying the laws of physics; it's about applying what many transportation engineers now call human factors. People see a road that looks safe and drive it accordingly, some a little too fast, too unsafe, and the result is a road where caution is less and accidents more than a road where caution is the rule.

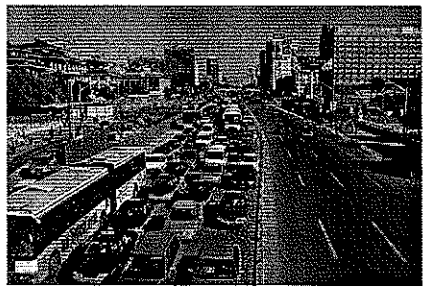
For nearly fifty years, the standards set for the interstate highway system have been held up as the highest standards of safety for all types of roads. (They are not or at least not, necessarily.) It is critical that a proposed safety improvement to a highway will actually improve safety. (It is not sufficient to claim that a road is substandard and that improving it will bring it up to standards.)

Rather than improve a whole roadway, improve just the places where there are actual records of safety problems. Where are there accidents? What are the causes of those accidents? Would spot improvements solve the problem?

What is liberating about this approach is that many more miles of roadway that actually need safety improvements can be improved if money isn't spent reconstructing those segments of a road that are actually already safe and don't need to be improved.

- **The Context Sensitive Solution:** Avoid bringing up a road to a particular standard to improve safety. Rather evaluate where safety problems occur and fix just the problem, saving time and money, reducing social and environmental impacts, and inconveniencing the traveling public less.

Mobility



The Daily Commute
Photo: http://blogs.move.com/first-time-home-buyers/wp-content/blogs.dir/21/files/2007/08/traffic.jpg

Congestion in North America has been increasing dramatically. As more motor vehicles join the daily commute in our larger cities, the more traffic slows down. Yet the national average commute time has stayed roughly the same for nearly 100 years, around 20 to 25 minutes. People seem to adjust their individual commutes—either changing jobs or changing where they live—to maintain a rather constant commute.

Although time has stayed essentially the same, the distance we commute has not. Fast moving freeway traffic has allowed us to expand how far we can go in those 20 to 25 minutes. As long as traffic is moving fast, freeways seems to work but as the road becomes more congested we try to cope by finding a new route, adjust our commuting times, or changing jobs or homes.

Another demographic phenomenon complicates this picture—the size of our households has been decreasing.

The issue is that every household has a base need for travel, regardless of how many individuals are in the household. Although trips to work may be better understood at an individual level, many trips—such as trips to the grocery store, to the veterinarian, and to the dry cleaners—are typically done per household. The more households, the less efficiently our highway system is used.

More households. More trips. More congestion.

This is why congestion is increasing faster than the population. In some major core cities, the average household size has decreased from nearly four people in the 1950s to less than two today. Although population has dropped significantly in most core cities across the country in the past fifty years, in some of those cities the number of households is actually rising again. With the increase in households, there are more trips and more congestion.

The transportation authority responds to congestion by planning, designing, and constructing additional capacity, typically more lanes in a particular corridor. But the solution is frequently short-lived and congestion re-occurs.

There have been many innovative answers to this dilemma. Urban planners tend to suggest improving transit or creating self-contained neighborhoods where people don't commute long distances but rather bicycle or walk a short distance to work, stopping to shop for all their necessities on their way home. And although many people have embraced this life-style, many, in fact most, have not, especially families with children.

Still there is a partial solution here. Increasing transit, improving bicycling routes, and making walking safe and inviting will decrease trips in motor vehicles and will help decrease congestion.

Fortunately, the federal government has conducted an experiment to test this notion in our nation's capital, Washington, DC. Imagine what the District would look like if freeways had been built to move people instead of the Metro system. Some may think that as the center of government the District would have remained vital, that trendy upscale neighborhoods would have become trendy and upscale even if the

freeways would have replaced the subway system. But there are scores of state capitals that used freeways as almost their exclusive means of moving people to prove that being the center of government, even in large prosperous states, does not necessarily generate a vibrant urban core.

Highways, but especially urban freeways, demand a considerable amount of space for the number of people they move. Transit, bicycling, and walking use space much more efficiently resulting in compact communities, less energy being used, and less adverse impacts to environmental quality.

A technical solution to the mobility dilemma may soon be offered by innovative motor vehicle companies—a solution that would allow vehicles to be spaced closer together at fast speeds through the use of smart vehicles, perhaps easily tripling the capacity of any single lane.

- **~~The Context Sensitive Solution~~:** Plan and design for multiple modes to improve system-wide mobility. Alternative modes for moving people, particularly transit, bicycles, and pedestrians, need to run both parallel to the highway and across it, forming a multimodal network, with each mode complementing and supporting the others. The more modes, the better. Lastly, be prepared to embrace emerging technology that will enhance mobility by increasing the capacity of existing lanes.

Access

Measuring access is important for a complete corridor. Access is not equal on most roadways. Some neighborhoods, some business districts, some properties have better access and flourish. Others have less access and become less attractive for development. The placement of access needs to be considered a prime community development tool and should be coordinated with the local jurisdiction. The measurement should be how well the access proposed by the transportation agency matches the need for access as defined by the community's planning documents.

The amount and location of access directly affects safety and mobility. Access, therefore, must be considered early during planning stages of any corridor. The transportation planner should work with community planners to optimize land-use, density, and other community planning factors so the roadway system is not overwhelmed by the demands of adjacent development.

Access for all modes is essential. Designing for improved mobility and access for motor vehicles cannot be detrimental to the access already enjoyed by bicyclists and pedestrians, especially access across a major roadway corridor. The roadway planner and designer should examine at the existing transit, bicycle, and pedestrian systems, to determine how the proposed project can help complete or extend these systems.

- **The Context Sensitive Solution:** Provide access for all modes of transportation within and across the highway corridor, especially transit, bicyclists, and pedestrians. Work with community planners to coordinate the location of access from a roadway with the community's vision for the corridor and any master plans already developed.

3.2 Community Support

Charettes get the public involved in the design process
Photo: http://reslifeweb.memphis.edu/reslife/LivingCommunities/ARCH_House_01.jpg

Transportation agencies have made tremendous strides in the past two decades trying to engage the public in its planning and design processes. Through the widespread use of Context Sensitive Solutions, agencies now routinely ascertain the issues a community has related to any particular corridor. By engaging the public early, often and frequently through construction, highway agencies have improved their relationship with the public. Typically the public, through representatives on an advisory committee, define the issues, generate a vision or goals for the corridor, develop a set of measurable objectives and frequently participate in the development of a set of design guidelines. They also may review and comment on preliminary plans and help communicate project progress to their constituents.

The public is considered a stakeholder—someone or some group that has an interest in the outcome of the planning and design process. Typically the public is represented by a number of stakeholders—residents, business owners, school districts, public safety personnel, the parks department, municipal authorities, and staff from regulatory agencies for example. The concept of public engagement is to generate support for the decision-making process and ultimately support for the decision itself.

Charettes get the public involved in the design process
Photo: http://www.smartgrowth.bc.ca/Portals/0/Images/CortesCharrette.jpg

Some stakeholders have other roles besides contributing to an advisory committee. Some can become partners in the development of a corridor. In fact the more that the transportation project can be thought of in terms of a corridor project, the more the responsibility for its success can be shared with other stakeholders.

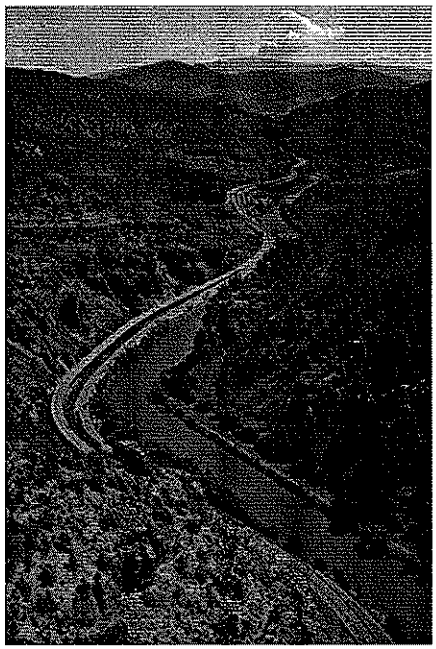
Regulators or a unit of local government, for example, rather than reacting to a proposal, help shape it, frequently defining the project scope so that the construction of the project also accomplishes a goal the regulator or local governmental unit has established as part of its mission—something that if done in cooperation can be achieved for less cost, in less time, and with less disruption than if both parties preceded independently. From a transportation agency perspective this makes regulators and other units of government design partners and potentially another source of funds. As partners, they will thoroughly understand the constraints that the transportation agency is operating under, the extent to which alternatives have been explored, and why a particular approach to mitigation was chosen, shortening review times and accelerating approvals.

Transportation agencies, except in the creation of Scenic Byways, have not seen a reason for extending the life of corridor advisory groups indefinitely.

This is unfortunate; much could be learned from the Scenic Byways model. A perpetual advisory committee could monitor the effectiveness of mitigation and enhancement in fulfilling the long-term vision and goals of the project. It could be used to attract additional funding for supplemental and even maintenance type projects. Most importantly, a perpetual advisory committee would become advocates for not only their corridor and the open planning and design process that was employed but also for the Department of Transportation that supported their efforts and their corridor.

A perpetual advisory committee would be an effective way to measure success. In particular, a perpetual advisory committee would be in the unique position to offer elected officials a candid assessment of the value of the state's transportation program has had for their community.

- this could cause stagnation in design & increase costs. and the development of agendas.



I-70 Glenwood Canyon improved environmental quality
Photo: Joseph J. Kracum

• The Context Sensitive Solution: By engaging all stakeholders early, often, and in perpetuity, a transportation agency will be in a better position to understand all of the corridor issues, establish goals and objectives for the project, evaluate potential alternatives, and how best to mitigate adverse impacts. Use the knowledge possessed by stakeholders, especially regulators and municipal authorities, to create design and financial partners. Be willing to extend the life of the Advisory Committee past construction into operations and maintenance so they become an advocate for the corridor, the transportation agency, and the state's transportation program.

3.3 Environmental Compliance

Environmental issues are a major concern of the public. Although roadways have been frequently considered an environmental affront, this is not necessarily a foregone fact. From the Bronx River Parkway to I-70 in Glenwood Canyon, highway projects have been used to improve environmental quality. Certainly easing congestion improves air and water quality but noise may increase unless other mitigative measures are implemented.

This requires creativity. Fortunately, the corridor planner or designer is not alone. If they have engaged all stakeholders, someone from a pollution control agency must be a partner. Recruiting them to help a transportation agency reduce its environmental footprint will not be difficult. For someone dedicating their lives to pollution control, one of their primary goals, typically both professionally and personally, is to make society and particularly its government, more environmentally friendly. Asking them to assist in reducing the environmental footprint of a transportation project or program will result in a rush of ideas and suggestions that additional assistance be sought from other regulators.

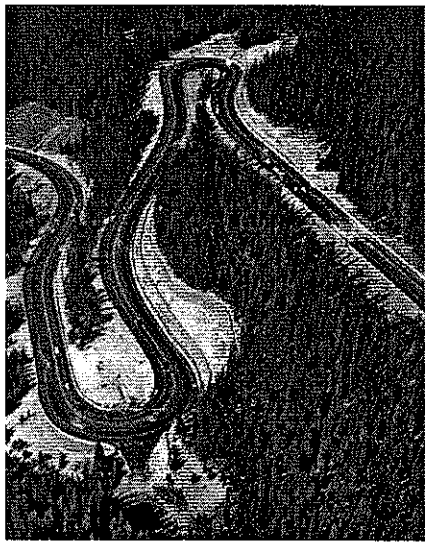
Essentially the stakeholders become the interdisciplinary team of designers required to truly develop that unique set of context sensitive solutions that form a complete corridor.

A road can and should improve the environment. It is important for the planner and designer to ask what regulatory agencies are attempting to do in this corridor or what they wish they could do if resources (money and people) were not a problem. A simple stream crossing is enhanced to allow fish to migrate. Bluebird nesting boxes are added to signs or rail posts. Drainage onto a state right of way is altered to create wetlands upstream. Overland drainage is used rather than pipes to reduce runoff velocity and improve water quality. Wildflowers are added for beauty and soil stabilization but also become needed habitat bees and butterflies.

These are small items but new ideas on how to design pavement to improve air quality or reduce noise are being developed. Plants as filters to improve both air and water quality. New lighting technology to reduce energy consumption. New reflective sign material eliminating the need to light signs. The use of recycled materials and how to design so recycling is easy are all part of a green approach to construction.

• **The Context Sensitive Solution:** Although environmental compliance is a requirement it still must be measured more methodically and periodically than it is currently. Are the mitigations implemented as part of this project working as expected, especially over the long term—twenty to forty years? What actions would regulators like to pursue even if the highway

By artfully using a variety of tangents and curves, a landscape architect's eye for natural landforms can help a roadway designer ~~can~~ create a graceful road that seems to avoid natural and cultural obstacles effortlessly, appearing to have been created in concert with the landscape.



A horizontal curve starts slightly before and ends slightly after the vertical profile Photo: Berthoud Pass, Colorado; taken by XXX

Vertical Profile

The way a road fits into the vertical variations of the terrain is also defined by a series of tangents and curves. The tangent of a vertical profile is defined as having a particular slope or grade. The profile of a typical road has a slope of 1 to 5 percent, with high-speed roads usually less than 3 percent. Low speed roads can be steep, in rare cases approaching slopes of 20 percent. (A 3 percent grade equals 3 feet of elevation change over 100 feet of distance.)

Vertical curves are actually parabolas that allow a vehicle to go over the top of a hill or the bottom of a depression while maintaining minimum stopping sight distances and motorist comfort. At the ends of any vertical tangent, a vertical parabola will exist at the crest or sag, essentially doubling the length it takes to rise any given distance. For example, a highway designer needing to make a road rise 20 feet at a 4 percent grade will need 1000 feet, not 500 feet, to make the elevation change. A similar approach to pedestrian and bicycle facilities creates a visually pleasing form but is not as necessary from a functional approach—the radii of the curves at the crest and sag for pedestrian and bicycle facilities can be much tighter.

Similar to horizontal alignment, vertical profile also allows the roadway designer to frame views and dictate the visual experience of a traveler. Cutting and filling the terrain (see Grading) must be done in a way that mimics the existing landforms or the roadside will appear artificial. On divided highways, independent profiles can be used so that each direction of roadway can respond separately to the dictates of the terrain.

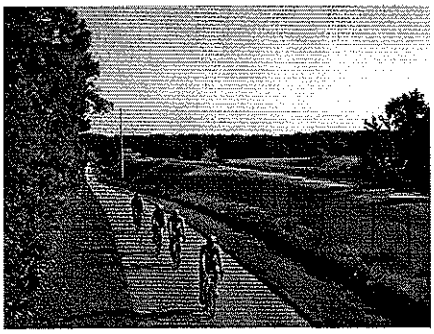
Coordinating Alignments and Profiles

Horizontal alignments and vertical profiles must be coordinated. The profile of a road can be greatly influenced by its alignment, reducing the need for fill and fitting the roadway more naturally into the landscape.

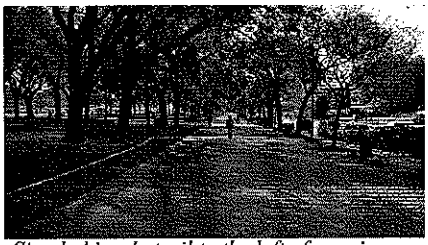
For general aesthetic reasons, the vertical profile of a roadway should be coordinated with its horizontal alignment. Usually a horizontal curve should begin slightly before and end slightly after the matching vertical profile, with the point of curvature on the horizontal alignment matching the point of vertical curvature on the vertical profile.

When developing alignment and profile, designers should consider the unique resources within the entire corridor, including distant views and landmarks—a steeple or geologic formation, for example—and design the road to take advantage of them. In this way, roadway geometrics fortify the experience of place and enhance way-finding cues.

Topography is an especially important influence on road profiles, and vertical alignments may be more critically linked to horizontal alignment when the landscape is rolling or mountainous. Independent or split alignments can help minimize disruption of landscape in steep terrains. Reduced speeds will typically allow for more variety in alignments, both vertical and horizontal, and thus allow designers to better fit the road to the natural landscape. In areas with dramatic terrains, designers will inevitably weigh trade-offs between design speeds, natural landscape features, and cost.



Bicycle corridors can parallel major interstates in a protected zone
Photo: Suncoast Parkway, Florida; taken by XX



Simple bicycle trail to the left of a main pedestrian walkway and can be paved
Photo: National Mall, Washington DC; taken by Emily Harner

needs for bicyclists in terms of street and lane width and motorists' operating speeds, potential conflict points such as turning and merging movements, common bicyclist movements through intersections and how bicyclists and motorists interact when turning, different bicyclist behaviors in response to different transportation facility types and characteristics, clear recovery zone, sight distance, and the most common bicyclist crash types. They should be aware of conflicts in the door zone of vehicles parked in parallel, and of the safety advantages of back-in diagonal parking over head-in vehicle parking.

On-road transportation facilities are an important part of a well planned network of integrated on-road and off-road transportation provisions that meet bicyclists' safety, convenience and connectivity needs. This network will provide for a wide range of skills and behaviors. Both on-road and off-road bike routes can be designated as part of a comprehensive transportation plan. AASHTO's Guide for the Development of Bicycle Facilities (1999) offers detailed information and standards on how bicycle routes should be planned, designed and constructed. An updated edition of the AASHTO Guide for the Development of Bicycle Facilities was in preparation in 2007 and 2008 as NCHRP Project 15-37. The Bicycle Guide can be used with any corridor type to help determine the appropriate provision of bicycle facilities.

A bicyclist of any level of skill or experience may decide to use an on-road or off-road facility alone or in combination on a given trip. This is usually a function of the destination/origin, trip purpose, the weather, light conditions or road conditions, including vehicle speeds and volumes and traffic controls. An off-road facility is not necessarily superior to an on-road facility for safety and convenience of inexperienced bicyclists.

Off-road facilities almost always serve the transportation needs of others (such as pedestrians, wheelchair users, in-line skaters, and equestrians) as well as bicyclists. The large speed differentials, the difference in the likelihood of and ability to make quick lateral movements, in the ability to stop, in mass and momentum, and differences between the material of the bicycle and the human body create the potential for conflict and catastrophic injury involving these two modes, just as these types of differences create potential conflicts between pedestrians and motorists or bicyclists and motorists.

Care must be taken when serving pedestrians and bicyclists on a single path, because of speed differential and the unpredictability of unrestricted movement of pedestrians. Additional path width and striping or other designations can serve to separate types of users if needed. Separate, perhaps parallel, routes may be preferable, depending on adjacent land use and availability, type of users, and anticipated volume.

Adequate path width can help bicyclists, who travel at significantly higher speeds than pedestrians, to pass other bicyclists and pedestrians on shared paths. Signage, pavement markings, colors, and surface textures can provide cues to both user categories, although some textures can present mobility barriers to bicyclists and wheelchair users. The AASHTO Bicycle Guide should be consulted for appropriate facility types and sizes and their application to the corridor type under consideration.

Off-road multi-use facilities are typically paved paths in urban or suburban areas, as well as other types of trails or greenway systems that traverse natural or rural settings. It should be understood that recreational trails are also used for transportation by bicyclists.

Aesthetic Bridge Design
Photo: Natchez Trace Parkway; taken by Figg Engineering

the process—landscape architects and architects as well as engineers. This helps ensure that aesthetic possibilities are not overlooked at critical points—during load calculations, for instance, which can affect choices in parapet design, lighting, and other enhancements. Furthermore, the best bridges are those that are artful in themselves. Even if the bridge is not one of the more elegant structural types (say, a cable stay or suspension bridge), designers from various disciplines can bring together science, technology and aesthetics to create an attractive, appropriate structure that suits its site. A bridge will be far less successful if superficial elements are tacked on late in the design process.

As primary elements of a bridge, the superstructure (girder or arch, for example) should be well-integrated into the design of the equally important piers, abutments and other bridge components. Attention should be given to individual units and the way they work together, and to the smaller subcomponents of each unit so that they are a consistent architectural ensemble. they should exhibit continuity with adjacent design elements, including walls, railings, sidewalks, and lighting. Special opportunity for coordinating elements exists when a bridge is part of a larger roadway project. In these cases, bridge features and adjacent roadway elements can be woven together to create a unified corridor environment.

Railings and other safety devices, such as vandal barriers, are both functional necessities and important aesthetic opportunities. They can reflect the area's architectural, natural, or cultural context through forms and color, and help reinforce a project's theme or message. When vandal barriers are required, they need not be unfriendly chain-link arches. Other options include welded wire meshes, available in various gauges and usually vinyl-coated, and clear acrylic panels engineered to resist breaking and permanent graffiti damage. Consulting with manufacturers early in the design process often helps designers develop cost effective, durable details.

Also important is the transition from the bridge structure into the terrain, so that the bridge appears to belong in the landscape, rather than being a separate object perched on the ground. This can be achieved with transitional elements such as planters, or through architectural and landscape architectural attention to the grading and planting at the bridge ends.

Bridges do more than carry vehicles over other roads, railroads, water bodies, or geographic obstacles. They either provide continuity for the community context on each side of the bridge, or become schisms in the community fabric. For complete corridors, it is essential that bridges provide continuity of pedestrian and bicycle mobility from one side to the other, and that they link the civic design elements that characterize each side.

When pedestrians and bicycles cannot effectively be accommodated on vehicular bridges, or when separate trail systems cross a roadway, stand-alone pedestrian and/or bicycle bridges should be considered as opportunities for aesthetic landmarks along a roadway corridor. They will experience more usage if they provide a continuous path from the ground to the bridge instead of requiring stairs, ramps or elevators for pedestrians.

Continuity of the community fabric can be achieved with architectural design of the bridge, drawing on contextual architectural elements from the adjacent areas, or using public art to reflect the culture of the community. Besides providing continuity across the bridge, reflecting the community in the aesthetic design of the bridge can become a signature identifying the community's presence to motorists on the road the bridge crosses.

Sometimes, providing continuity across a bridge warrants including planting on the bridge deck to continue the landscape design of the road on either side of the bridge.

highway construction and it behooves a designer to engage utility company staff to find out if they are interested in burying their lines at the same time as road construction. If utilities cannot be buried (and even buried lines have above-ground utility boxes), designers can improve visual quality by placing utilities on a separate alignment or screening them with landforms and vegetation.

Hiding buried utilities in rural areas is best accomplished by varying the width of the corridor cleared for construction and maintenance, blending a wavering swath cut through the landscape for utility routing with an undulating edge of existing herbaceous plant material in the existing landscape. Adding topographic variety also helps to hide the linear nature of buried utilities.

In urban areas, utilities can be placed in a specially designated utility corridor adjacent to the edge of the traveled way, behind the curb or shoulder or even in the shoulder. This allows easy maintenance and avoids impacting traffic if the utility needs repair.

Marking and mapping the as-built location of utilities is a valuable tool for facilitating maintenance, improving safety, and speeding future work.

Although hiding utilities is usually functionally and aesthetically preferable, one utility that is frequently buried should be considered for daylighting: the storm sewer. Routing runoff across the landscape via sheet flow or through planted swales is generally better for water quality, wildlife, and the visual character of the landscape than burying it in pipes. (See Hydrology.)

4.5 Outside the Right-Of-Way

Visual Impact Assessment

Viewed as Mitigation

The public nature and visual importance of roadways require that visual impacts - positive as well as negative - be adequately assessed and considered to develop a complete corridor. Community acceptance of corridor projects may also be strongly influenced by its visual effects.

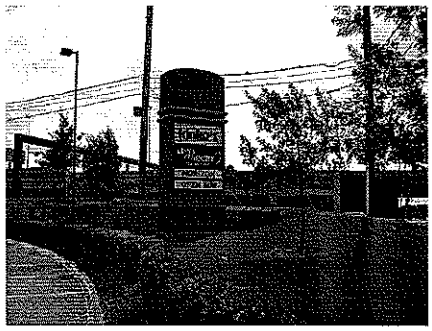
Visual impacts are seen both in the "view from the road" and the "view of the road". The importance of the first has long been recognized. In recreation surveys, Americans have repeatedly ranked pleasure driving on scenic roads as one of their favorite activities. Researchers have also shown that the view from the road is the basis for much of what we know about our everyday environment and for our mental image of the city. For this reason, community groups are rightly concerned with the visual character of roadways in their town or city; first impressions count.

Systematic consideration of the view of the road is particularly important, since there may be many "eyes per mile" along the right-of-way of a proposed project. If existing views are very high in quality or are valued by large numbers of people, the visual costs borne by highway neighbors could outweigh the visual benefits accrued by highway users. In such cases projects must be carefully planned to ensure that pleasing vistas for travelers are not developed at the expense of views from surrounding areas.

- What, visually, are the relative advantages and disadvantages among alternatives?
- How can adverse impacts to visual quality be avoided, minimized, or compensated?
- How can existing visual quality be enhanced by the proposed project?

Answering these seven questions, with high fidelity to the process and terms, the VIA process will reward project sponsors, designers, and constituents with a transportation project that is sensitive to its context and welcomed by its neighbors and travelers as a community asset.

Billboards and other outdoor advertising can clutter a streetscape
Photo: XX



Architecturally designed monument signs are a more attractive form of outdoor advertising
Photo: XX

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Outdoor Advertising

Billboards and other outdoor advertising are controversial topics. Because most advertising is not permitted within public rights-of-way, except on a temporary basis, it most often falls under local land use regulations. However, the Federal Highway Beautification Act of 1965 established a national policy on the erection and maintenance of outdoor advertising signs. Some states, such as New York and California, have adopted rigorous outdoor advertising sign regulations of their own.

> The nature of the controversy is well expressed in the following statements from opposite sides of the issue: the Outdoor Advertising Association of America, Inc. (OAAA), and Scenic America:
>
> Outdoor advertising is an important communications medium in an increasingly mobile society. Businesses communicate with customers. Candidates reach voters. Police track criminals. Charities advance the greater public good.
> —OAAA (http://www.oaaa.org)
>
> Visual pollution. Sky Trash. Litter on a stick. The junk mail of the American highway. Nothing destroys the distinctive character of our communities and the natural beauty of our countryside more rapidly than uncontrolled signs and billboards, which is why Scenic America encourages communities to adopt ordinances to stop the construction of new billboards.
> —Scenic America (http://www.scenic.org/billboards)